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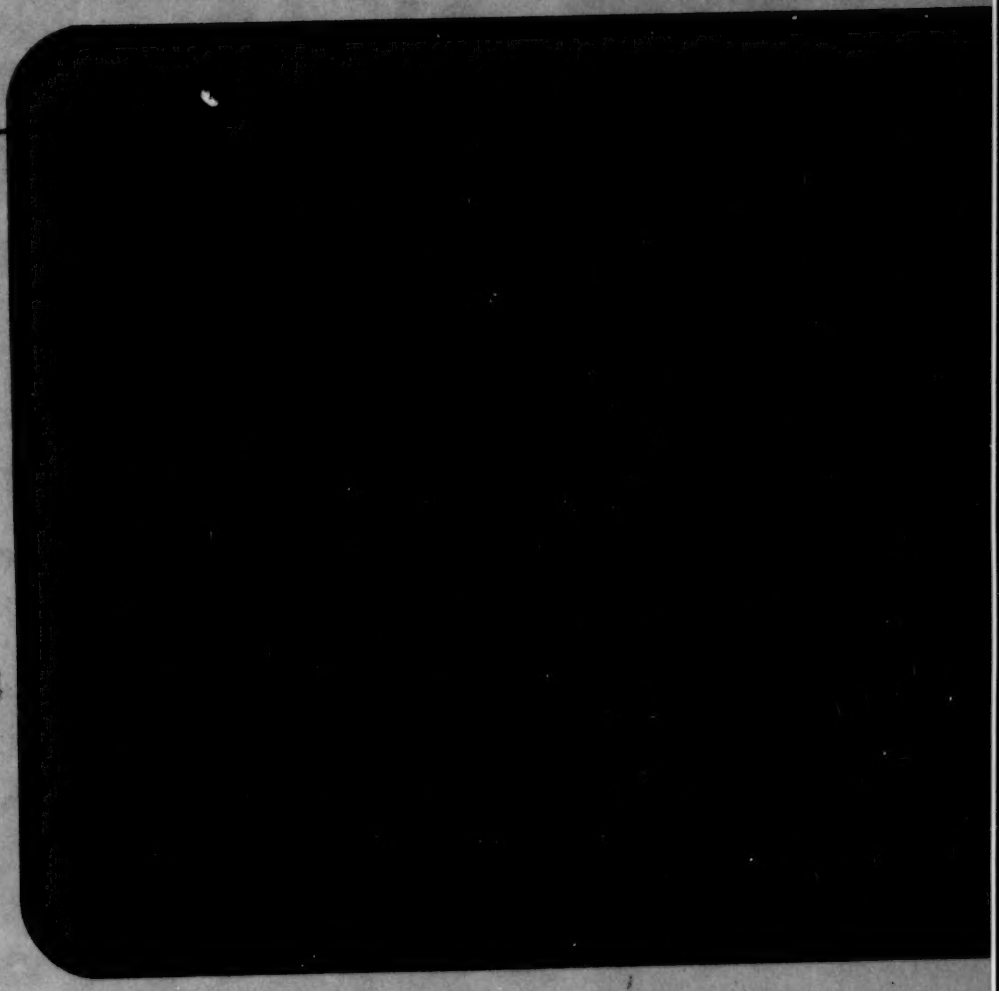

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• *The ups and downs of, and the outlook for, a great medium of entertainment*

The Future of Motion Pictures

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Cecil B. DeMille

THE motion picture industry today is a little in the position of a man who having recovered from an illness, is held back from full vigor through the sheer weight of the care and attention focused on him.

No person can be truly healthy while doctors and well-wishers continually test his pulse, take his temperature, warn him against draughts.

And no industry—especially a creative industry—can function with full effectiveness when the concentration is on what may have been wrong with it, instead of what is right with it.

The advent of television did shake the equilibrium of Hollywood and other film centers, but that has been done before, and as before the results are healthy.

The Story's the Thing

Filmmakers on the whole have relearned an eternal truth, a truth that has existed since long before the first cavemen huddled in the shelter of a rock, spellbound by a good story well told.

It does not matter how or where the story is told. It only matters that it be a good story.

It does not matter today whether that story is told on a 21-inch television screen in a man's own home, or on a huge VistaVision screen in a motion picture theatre. It is the quality of the story which will impel a man to turn the dial, or to line up before the box-office to buy a ticket.

But what he sees in each instance may still be a motion picture—with the difference in the method of distribution. One may be broadcast on airwaves, another projected to a screen.

For some stories, either method of distribution may be equally satisfying. Stories of epic proportions require large canvases. One cannot paint in miniature the Battle of Waterloo, or the Exodus of the Children of Israel.

The Competing Entertainment Media

By the beginning of the 1920's, motion pictures were the most universally popular medium for entertainment the world has ever known. Small stock companies had almost vanished, and the theatres in which they had formerly performed were rapidly being remodeled for the projection of motion pictures. And as happened a few years ago with films, the end of all legitimate theatre was predicted.

Then came radio. Entertainment was as *free* as the air that carried it into every home. The speculation was ominous—more ominous than it was at the start of the so-called

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About the Author—

Cecil Blount DeMille was born in Ashfield, Massachusetts, on August 12, 1881; and the DeMille family home was in Washington, North Carolina. In 1913, he, with Samuel Goldwyn and Jesse L. Lasky, founded the Jesse L. Lasky Feature Play Company, for which he was Director General. The company merged in 1918 to become Famous Players—Lasky, and in 1927 to become the present Paramount Pictures Corporation—with which Mr. DeMille is now associated as an independent producer.

He has produced seventy pictures, beginning with "The Squaw Man" in 1913, and including "Carmen" (1915), "Male and Female" (1919), "The Ten Commandments" (1926—his first religious film), "Dynamite" (1929—his first sound film), "The Crusades" (1935), "Samson and Delilah (1949), and "The Ten Commandments" (1956).

His long career has been signalized by the award of many honors, including honorary degrees from five universities.

"threat" of television. Who would ever again *pay* to be entertained? Radio also challenged the press: It delivered a news beat faster than any newspaper could get an "extra" on the street.

Television presumably sounded the death knell for radio and motion pictures, those upstarts which in their turn had caused such consternation. Television had everything radio had, plus a picture screen. It also had everything movies had, it was said, except a price for admission.

In 1951, a still memorable obituary for films was published in a weekly magazine under the title, "Now It Is Trouble That Is Super Colossal in Hollywood."

Recent Big Films

Two years later, in 1953, two of the three largest grossing pictures in the history of films were released. These are THE ROBE and THE GREATEST SHOW ON EARTH. Already in work was THE TEN COMMANDMENTS for which Paramount Studio ventured the largest sum of money ($13,500,000 negative cost) ever invested in a single motion picture. In a period of a little more than two years, in a small fraction of the theatres of the world in which it will be shown, more than 53,000,000 people have lined up at a theatre box office to purchase tickets to see it. (I can speak freely of its financial success since that portion of the profit which would come to Mrs. DeMille and me, we have assigned to a trust fund for educational, charitable, and religious work.)

In these same years that THE TEN COMMANDMENTS has been showing, AROUND THE WORLD IN 80 DAYS, THE BRIDGE OVER THE RIVER KWAI, and others, have also made remarkable records.

Paramount this past year has invested another staggering sum of money in a single film, more than a $5,500,000 negative cost for THE BUCCANEER, which was filmed with my associate producer on THE TEN COMMANDMENTS as producer, and Anthony Quinn directing.

Other studios are also investing large sums in big films. Metro-Goldwyn-Mayer's BEN HUR, now being filmed in Rome, it is said will have a negative cost of $15,000,000.

This doesn't indicate an industry tottering on extinction, or one even with a chronic disability. For astute business men—and there are those in motion picture studios as well as creative artists—to venture sums of this size, there must be dollars and cents proof that this money, with a reasonable profit, can be returned.

And there is.

A Permanent Art Form

The future of motion pictures has already been written on the balance sheets of the recent past. A motion picture of special quality has a far larger audience today than went to theatres to see any motion picture in the so-called heyday of films.

Television, not motion pictures, however, is in the "movie" business. The "A" picture has become small and the "little" picture, the "B," has met a far kinder fate than its predecessor, the stock company. It has found a home on the television screen.

Motion pictures have taken their place with legitimate theatre, as a permanent art form which will live and flourish so long as its artists continue to grow and create.

This means full health and vigor—not the pale efforts of an invalid industry doubting its own strength and leaning on the coddling advice and ministrations of all the would-be doctors.

• *A contribution to understanding the strength and weaknesses of a new tool for general management use*

Some Limitations on Operations Research

George S. Odiorne

WITH the exception of a corporal's guard of systems engineers in the defense establishment and certain universities, operations research today is being promulgated by a body of talented amateurs. This is especially true where OR is being applied to general management problems in the manufacturing and selling organization. The possibility that the mathematical methods of the operational researcher in such areas as underseas defense, or anti-missile missiles could be transferred over into the mundane problems of marketing, labor relations, organization planning, executive decision-making, personnel management and delegation is an appealing one. There are ample case studies to indicate that it has fruitful applications in some of these areas. It is the thesis of this article to suggest that there are also limits of darkness into which it would be reckless and foolhardy for any general manager to plunge, shielded only by the data and methods of operations research to guide him.

About the Author—

George Odiorne is Assistant Director of Personnel Administration for General Mills, Inc., Minneapolis. Before assuming this position, he was Division Manager at American Management Association in New York. For four years he was on the faculty of Rutgers University, where he taught management, including the various areas in the management sciences and quality control. Subsequently, he was a manager in the production division of American Can Company for some ten years.

He holds a doctorate in economics from New York University and is the author of some sixty published articles, including several on statistical quality control and operations research. A previous article by Doctor Odiorne, "Operations Research: Need for Re-evaluation" appeared in the July, 1956, issue of the Michigan Business Review.

A Word of Definition

Unfortunately, no article on operations research could begin without defining terms and orienting the reader to the field; for, if truth be known, there is no common language between most managers and most operations research people which can be thrown forth unsupported by such clarification. As the term is used here, "operations research" refers to those mathematical techniques developed during World War II in military operations to sharpen strategy and tactics in the face of uncertainty. These techniques were subsequently modified to fit industrial problems and have been used to solve problems of transportation networks, production planning, inventory, and similar systems in business management.

It includes such techniques as linear programming, queueing theory, monte carlo method, simulation, and other methods of reducing uninsurable risks in managerial decision-making. It has a body of literature of a hundred or more books, thousands of articles, three or more major periodicals, and at least three societies dedicated to its study and promulgation. It also has attracted from industrial engineering and market research, as well as computer manufacturers, a hard selling group of talented amateurs who propose it as the new "Science of Management."

The key method of the OR man is to make

a mathematical model of the system, relating the certainties and uncertainties in any situation, in order to measure and assign relative success rankings to possible solutions.

This—greatly oversimplified—is the meaning of operations research as it applied to management. How much reliance can the general manager place on mathematical methods of managing?

The OR Movement

In addition to the scientific theory of operations research, and indeed quite apart from it, is a movement to promulgate it which is characterized by a zeal which in its extremes approaches that of a political or religious group. Like the Darwinists of the natural sciences or the Freudians in the psychoanalytic field, the OR men since the end of World War II have mounted an ideological and theoretical assault upon management theory which still rages. Representing a thin line of brothers who hold hands across the land, the movement has the excitement—sometimes bordering on fanaticism—which has characterized many earlier fights against obsolete ideas.

Since the ultimate acceptance of the OR concept would mean a drastic change in the way most companies are managed, the entire OR approach as a way of managing might be called revolutionary. Two particular methods of managing are under special attack:

1. The old-fashioned intuitive methods of entrepreneurs who operated the company by hunch and experience from the front office, on the solid foundation of property rights which they held as owners. These methods are still the way of management in most small businesses.

2. The newer "professional" management methods rooted in a so-called "human relations" approach to management. This second, still not wholly successful, school of management assumes that management means getting results through people and concerns itself with such things as motivation, interpersonal relations, communications between management and worker, and alleviation of worker discontent.

OR in its unadulterated form assumes that both of these methods could be supplanted and done better through the development of mathematical models which describe the activity, and, upon the basis of these models, the prediction of alternative solutions to management problems.

Basic Assumptions of the OR Movement

As a group, this OR movement has certain basic assumptions about science, mathematics, human nature, and the purposes of business—sometimes unrecognized to themselves—which have a bearing upon their importance and upon their chances of succeeding in their drive to modify management methods closer to their heart's desire.

1. *In mathematical theory* they tend toward mathematical models, especially in terms of probability theory, and finite mathematics. Linear relationships loom especially large in their theory. Basically they assume that management processes can be described and predicted mathematically.

2. *In scientific philosophy they are "logical positivists"* and adhere mainly to the scientific theories of Percy Bridgman, acting upon the assumption that every area of management is a "closed science" which is capable of generalized mathematical description through models if only enough time, money, scientific brains, and top management support were to be forthcoming.

3. *The computer* is seen as an instrument which will implement the installation of these mathematical models. As systems designers they become masters of control over decision-making by the computer.

4. *They assume the language of business to be accounting.* This includes the conventional accounting definitions of cost in terms of fixed value dollars and of profits as the difference between expenses and income during any stated fiscal period.

5. *The purposes of business* they assume to be measurable in terms of accounting profit, distributable to stockholders first, other uses to follow.

6. *In their theory of human behavior* they are philosophical hedonists. They assume men to be quite like Adam Smith and Ricardo's "economic man." Rationality, a key term in their system, assumes that man will act to obtain the things that have value to him, principally money, but also other values.

7. *In Social Philosophy* they are conservatives, tending toward an older, property-centered philosophy. As this converts into management theory, they place little confidence in new-fangled participative methods.

In most writings about operations research, emphasis is placed upon the quantitative, mainly a study of the techniques of applied mathematics which are to be used. Of the seven areas of assumption outlined above, the mathematical assumptions are of key importance, for any deficiency in mathematical techniques or its application makes the remaining assumptions trivial and inappropriate. This is not to say that correct mathematics cannot be negated by improprieties in the remaining areas of heuristic principle. Some writing has been done in these latter areas. More, undoubtedly, is required if OR as a technique is to be assayed and fitted into its proper perspective as an instrument of business planning and control.

In view of the essential role of mathematical model building in OR, it might interest a general manager to take a closer look at OR on its own ground—the field of Applied Mathematics.

OR Considered as Mathematics

When we survey the wonderful gamut of mathematical tools which the OR people have brought to bear upon management problems, it's really most surprising how their ingenuity has flowered. Tick off the various branches of *avant-garde* mathematical methods and you'll find the OR people have used most of them to simplify (some say oversimplify) the nature of business. Not only are arithmetic, algebra, geometry, and the calculus employed; but also more advanced forms of mathematical probability, statistics, symbolic logic, Boolean and Matrix Algebra, Laplace Transforms, and finite mathematics, to name a few.

No simple theoreticians of the ivory tower, the OR men are applied mathematicians and take the theoretical findings of the pure mathematicians and convert them into beautiful and useful analogs and models of life by which the perplexed executive supposedly can make the decisions for his firm.

Since the models are so precise and most business decisions so muddled and wrong-headed, it is apparent to the OR man that this swap—of simplicity for confusion—must appeal to every rational man. Carrying this through to its conclusions, it therefore is proven that those who do not accept this form of activity in business are not rational and, therefore, are probably inferior men.

Yet, there are some few unusual men who double in talents of running businesses at the same time they understand advanced mathematics and feel that the two do not always lie compatibly together. One of the major reasons for this they see as lying, not so much in the stupidity of businessmen nor the intractable resistance to change of managers, as in the inadequacies of mathematics as an instrument for control of the complex system that is business. This is especially true, they say, in such management areas as organization planning, policy-making, delegation, labor relations, customer and public relations, and decision-making. Let's look—as laymen—at a few of the limitations of applied mathematics as a tool of managerial decision-making in these areas.

What Is a Number?

To begin at a very fundamental level, a flaw in the use of mathematics for managerial decision-making occurs when we look at quantification as the spine of mathematics. Quantification means stating the nature of the data in terms of number and presumes many things.

For one thing, it presumes that we are being quite sophisticated in our understanding of what "number" means. Perhaps it would be helpful to begin with saying what "number" consists of.[1]

A quartet of workers is an instance of the number "4," for example, the "4" being an instance of number, but this quartet of workers is not an instance of number. Although the number "4" is a property which all quartets have in common, it is not identical with the quartet of workers whose names are Bill, Harry, Joe, and Mike.

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[1] Bertrand Russell, "Definition of Number," in *Selected Papers of Bertrand Russell*, Modern Library, N.Y. 1927.

In logic there are two ways of conceiving of this quartet of workers. The first is to identify them by name (and all of their other manifold identifying traits), and we call this system one of "extensional" definition. A second method of conceiving this quartet of workers is to identify them by a trait this group has in common with all other quartets, which is that they are instances of the number "4." This latter method we call "intension."

It is apparent that in OR we largely adopt the technique of intension.

At this point we have made an important step. While it is always possible to reduce the extensional definition to the intensional one, it is often impossible to reverse the process and reduce the intensional one to the extensional one. In our quartet of workers, for example, it is always possible to theoretically reduce Bill, Harry, Joe, and Mike to the number "4." It might not always be possible to recoup them from this state. Yet in fact, Bill and all of them possess a certain quality which nothing else in creation possesses, even if it is nothing more than the property of being Bill or Harry or Joe or Mike. Somebody. Bill is never really Number 1; he is forever "Bill."

The most important reason we cannot reduce intensional definitions to extensional ones in every case is, of course, that there are infinite numbers. There are not only an infinite number of 1's for example, but of 2's, 3's, and 4's. If this were not true, we could be content with describing characteristics of things, rather than identifying according to their similarity with other things having the same characteristic number. In other words, in quantifying we identify objects or classes according to a common similarity with other objects or classes, i.e., they have the same number.

This is all most helpful, and we could not function in a scientific society without such a perfectly logical plan. The pinch comes in the fact that when we choose "number" as a common property of people or things (or classes of them), we assume that uniqueness is not important.

Yet what are the cases where uniqueness is not important?

The Importance of Uniqueness

If we manage people with the basic assumption that individuality and uniqueness is not important, we tread a path that leads us to goals and conclusions that become quite unsatisfactory in terms of management of the firm—to say nothing of life on this planet generally.

This does not assume that we cannot use numbers as a means of easy accomplishment of a task. Frank Gilbreth used to count his twelve children at such crucial times as bathtime, etc., but this did not cause him to lose sight of each one as a unique, individual person with likes, dislikes, strengths, and weaknesses. Such perfectly decent switching back and forth from extensional to intensional definition is a most admirable and necessary situation in management. On the other hand, were OR techniques to reduce the basic uniqueness of people and their values to number without regard for the basic rightness of maintaining this uniqueness for its own sake, we replace the human values of our culture with a chilling intellectual abstraction.

Even if this de-humanization of management weren't important, we would find that in the mathematical methods themselves there are improprieties in reasoning when we become overly mathematical in management.

As amateurs in both OR and mathematics, let's look briefly at one fundamental flaw which appears in two of the favorite tools of the OR man—Linear Programming and Game Theory.

The Problem of Low Pressure Motivation

Because they must walk with humility in the halls of non-mathematician managers who sign the checks, OR men frequently are forced to oversimplify, to the extent that they often fall into the chain reaction of "simplification-oversimplification-falsehood."

In linear programming, for example, they

most often wind their cerebrations with mathematical models which avoid "inequalities." The theory of consumption in linear programming, for example, is most often expressed as an "equality," that total consumption equals the budget allowed. This skirts the very real problem of inequalities which are caused by satiety or a general reluctance to buy. This is evidenced in the recession of 1958. A linear model which doesn't explain why $Bill_1$ of our quartet continues to drive his 1953 car and avoids the blandishment of "you auto buy now" despite a larger bank account than he ever had in his life would force the linear programmer on consumption theory into the murky area of inequalities.[2] This would not only be a mathematical mess, impossible of verification, but would also require that the OR man get into calculations more complicated than he could scientifically devise or his unscientific boss understand. Therefore, he can only exist if he continues to assume away half the truth of the situation, unfortunately in this case, the significant half.

In short, in order to develop a model of manageable dimensions, many OR people are forced to produce tautologies which are only useful as a partial description of the situation.

Game Theory

Or take, if you will, certain assumptions of the OR men in the use of game theory. Game theory is based upon the findings of two mathematicians, Morgenstern and Von Neuman. Its purpose is to find mathematically complete principles which define rational behavior for participants in a social economy—specifically a competitive situation. Be it a war, a competitive marketing campaign, or simple tactics in office politics, this game theory should point out a system which affords a superior position to rational behavior over any other kind, including irrational behavior. In order for this to work, the player must know what strategies he is allowed, what strategies his opponent is allowed, the results of any combination of opposing strategies, and the feeling that his opponent has the same rules of the game as he. The rule is to avoid picking a dominated strategy. Under this system, what we ordinarily term "uncertainty" is substituted with a tool called ***minimax***.

While all this is highly intelligent analysis, it, too, can break down in many business (and life) situations. Take the case of $Harry_2$ in our quartet. Perhaps he is reluctant to take part in the contest at all.[3] Maybe he uses a non-minimax strategy because he thinks that's wisest, or it's simply his custom to follow that pattern, or his wife told him he should. His wife, as everyone knows, isn't very rational.

One of the most triumphant patterns of human behavior is the innocent victim who wins the girl, the prize, or simply foils his smarter associates by following a traditional or personalized but irrational pattern. The dumb hillbilly in "No Time For Sergeants" who constantly wins victories over his cleverer tormentors simply because he is naive and innocent enough not to know that he is in competition is a case in point.

Far from being dramatic exceptions to the norm which are sufficiently small in number to be ignored, there is some evidence that enough silly, irrational, wrongheaded, biased, emotional, or innocent people are caught in competitive situations to throw out on numerous occasions all of the basic assumptions of game theory as a set of "mathematically complete principles" for business competition.

But these mathematical tools are new and admittedly need more work before they are perfected. How about that most reliable and relied upon procedure—probability sampling?

Of Statistics and Probability

Every business man from the corner grocer through the directors of General Electric takes risks regularly upon the basis of hypotheses. He hypothesizes that, if he buys warehouse stock, the demand for these items will increase.

[2] Makower, H., *Activity Analysis and the Theory of Economic Equilibrium*. N.Y., St. Martin's Press. 1957. Ch. 3.

[3] Daniel Ellsberg, "The Case of the Reluctant Duelist," *American Economic Review*. December 1956.

If he has inside information, or can discover a product which "can be made for a dime, sells for a dollar, and is habit forming" he will become rich, or at least will recoup his outlay. Through probability theory OR men enter this complex field of business and commerce and reduce this risk by describing where the probabilities of success and failure lie. In quality control, market research, production planning, and myriad other areas, probability is posed as a means of reducing uninsurable risk in business. What is this probability which the OR man wields, often like a magic wand?

Most OR men—since they are mathematicians—first define it as mathematical probability, which can be defined as the relative frequency of events of phenomena within a class of phenomena called a "population."

Less well-known but equally persuasive are some philosophers, notably Rudolf Carnap, who define probability differently. They prefer to use the term as meaning a measurement of the chances that something is true—in the same way that a jury decides a defendant is guilty or not guilty based upon a weighing of the strength of the evidence.[4] This concept is called "inductive probability" and is best handled by a philosopher trained in symbolic logic.

While OR men often declare that symbolic logic is one of the pliers in their tool bag, no important reconciliation of the differences between these sometimes conflicting instruments of statistical and inductive probability has yet been proposed in action nor in theory.

This intellectual dispute, which dates from the original works on probability by Laplace over a century ago, puts forth two opposing views as to the nature of probability. The British geophysicist, Harold Jeffreys, in 1939 wrote a book called *Theory of Probability*. Like Lord Keynes in his *Treatise on Probability*, he rejected the statistical concept of probability. As laymen we might logically ask the OR men who propose statistical probability as an instrument of decision-making in general management how they would go forward with the evidence of these estimable thinkers before we chuck out the present decision-making methods of our executives—or perhaps the executives themselves—if we are to grasp the scheme of OR entire.

How, for example, would the statistical probability experts retort to Jeffrey's "principle of indifference" in which he states that, "if there is no reason to believe one hypothesis rather than another, the probabilities are equal." Much simpler sounding in action than computing Chi Squares or analyses of variance, it has the familiar ring of every day usage in managerial decisions. This is not to say that the statisticians are wrong—or even a bit mistaken. It merely suggests that perhaps OR is ready to go back to the drawing board in certain of its methodologies before coming forth to guide the over-all operations of the company.

The Sampling Problem

Still another cropper which underlies even the most accepted statistical techniques is the randomness problem. To bring up this old stumbling block of samplers is to bring forth snorts of impatience from the old hands who *concede* the existence of the problem and confess that certain of the careless or untrained samplers occasionally fall into this trap.

Briefly stated, this trap consists of generalizing about a whole population upon the basis of a few samples. The presumption is, of course, that the samples taken are representative of the larger population; and, therefore, it isn't necessary to look at all of the individual items, merely the sample, and to infer the nature of the larger group by close examination of the smaller.

The scientific validity of this technique is sometimes demonstrated by the sophisticated to the ignorant by means of a huge bowl of beads. The bowl contains 2,000 beads, mostly white, with a few different colored beads, say red and blue. The sampler dips a paddle into the bowl and extracts 100 beads. He counts

[4] Rudolf Carnap, *Scientific American*, "What is Probability?" 1954, pp. 128 ff.

the off-color beads. After doing this three times or so and averaging the number of off-color beads in each sample, he then generalizes about the total number of each color in the whole bowl. If you don't believe he's right, then you may count them. I've done this and found he was usually correct; if the sample was really random, then the sample was representative.

Yet we know that in action these things can be deceptive and on occasion downright misleading. If they were not, Alfred M. Landon would now be ex-president of the United States; and the *Literary Digest*, in everyone's magazine rack.

One of the most lucid explanations of the hitch in this randomness problem which requires clarification is made by a statistician, Dr. Enoch Ferrell, of Bell Telephone Laboratory.[5] He describes four problems or stages in sampling:

1. A mass of raw data can be grouped and classified in such a way that all of the information is summarized in a few numbers. This we call a frequency distribution and is best defined as *descriptive statistics*.

2. Given a bowl full of numbers about which we know everything and from which samples are to be drawn in the future, predict the characteristics of these samples; this probability we call *a priori*.

3. Given a bowl full of numbers about which we know little or nothing, and a given sample is drawn from that bowl about which we know everything; estimate the parameters of the universe in the bowl. This we call *statistical inference*.

4. Given a set of observations about which we know everything, was there a bowl at all? Can we reasonably say that our sample is from a single universe, or should it be treated as a sub-sample from several universes with perhaps a few wild shots thrown in?

It is this fourth area which puzzles the statistician as a technical problem, and, in his unknowingness, puzzles the manager who would rely upon the findings. As Dr. Ferrell put it:

The fourth problem is really an attack on the question of what mathematical models *if any* [italics his] fit the physical situation.

He goes on to say that the fourth problem is the basic problem of the engineer or scientist to solve first.

He never knows what is in the bowl; he is never even sure there was a bowl. He only has the numbers that he hopes form a sample. He must first try to determine whether or not they do belong to a universe. If not all of them, then do most of them—and which ones? Only after he has answered this fourth question does the third make sense. And only after he has gotten the parameters can he hope to solve the second problem and make a prediction. He must of necessity start at the bottom and work up, whereas the mathematician starts at the top and works down.

For the work-a-day manager to whom the niceties and ramifications of statistics are unintelligible, such can only serve to ramify his intuitive hunch that all is not as procedurally perfect in statistics as he is sometimes led to believe. That he asks for theoretical clarification of these inconsistencies before adopting them *carte blanche* is not necessarily a sign of anti-intellectualism on his part. On the contrary, it is the sign of great native intelligence and is based on the need of underlying assurance that his advice is sound and scientifically reliable.

Summary

Because Operations Research is being used successfully in such specific technical business-related areas as marketing, production planning, market research, quality control, product mix and the like, it is an easy step to generalize that it is but a hop, skip, and jump to a general system of management in which the over-all management process is considered as a feedback system. Because the mathematical tools are available to handle linear relationships and equalities, probability sampling, game theory, and queueing theory in this management of physical things, it becomes an enticing illusion to state that the next step will be an over-all management theory based upon mathematics.

There is no denying that OR *works* in the management of these physical phenomena of the business. There is, however, no evidence whatsoever that would lead us to believe that

[5] Ferrell, Enoch "Control Charts Using Midranges and Medians," *Industrial Quality Control*, March 1953.

the natural state of management which consists of "getting results through people" is subject to anything more than tautological description using the presently available tools of mathematics.

As Dr. Glen Olds put it recently in the *Saturday Review*, "man is not a fact," and accordingly we cannot reduce him to a number, nor will the social sciences be found as superficial as many of the come-latelies to its home playing grounds imply. We have come some distance since Aldous Huxley charged man to sit down before the simple facts—and learn. In the social environment that is business and the direction of the social institution which is the firm, facts are nothing more than commonly held opinions, which will not be the same this afternoon nor tomorrow. No fact, however irrefutable empirically, has in it the quality which motivates men.

Coming to Terms With Man

To understand management in the area which relates to personnel and manpower, we must come to terms with man, but not with the numbers which make him intensionally manageable from the remoteness of company headquarters. Rather we must come to terms with his gut-reaction, his sentiments, and the emotions which sustain him, keep his social system from flying apart into a billion atoms, and the loves and hatreds which make his work a thing of joy or of despair. I see little hope for managing people by mathematics if we are not at all concerned with alleviating what Daniel Bell has called "work and its discontents."

I see no zeal for the real management problem in OR to date, at least not in the mathematical weapons which thus far have been dragged from the armory of mathematical theory.

NEW FEATURES INFLUENCE PURCHASES OF HOUSEHOLD GOODS

ANN ARBOR—Interest in new product features leads to increased buying of household goods, University of Michigan research indicates.

Studies conducted by the U-M Survey Research Center show this interest contributes both to rapid replacement of conventional appliances, such as ranges or refrigerators, and to initial use of newer equipment, air conditioning or deep freezes, for example.

Evidence linking interest in new product features to buying plans and actual purchases has been developed by Dr. Eva Mueller, of the Center. Her findings are reported in a new book, *Consumer Behavior: Research on Consumer Reactions*, edited by Lincoln H. Clark and published in July by Harper and Brothers (472 pp., $6.50.)

The U-M interviewers asked a random sample of 855 urban families about their interest in new features of refrigerators and other household goods. A year later they checked actual purchases by these families. Among those who owned late model refrigerators in good condition at the beginning of the study, purchases of brand-new models were three times as high among those who expressed interest in new product features, as among those who had no such interest.

"It's difficult to explain these replacement purchases for any other reason than an interest in new product features," comments Dr. Mueller.

• *A selected list of*

Recommended Readings in Industrial Relations

Eleanor H. Scanlan

Boulware, L. R. "Politics—the Businessman's Biggest Job in 1958." *Labor Law Journal,* (Commerce Clearing House, Chicago) Vol. 9, No. 8, August 1958. pp. 587–594.

The author urges businessmen to take as much interest in politics as labor leaders do. In recent years businessmen have paid too little attention to politics and politicians and their impact on management. Labor leaders, however, impose constant pressure by "political bargaining" or "negotiating in the newspapers," far in advance of actual contract negotiations. They no longer act merely as economic agents, but as politicians, exerting influence at the local and national level. The public servant has learned that it pays to be on the side of the union official—right or wrong. Victor Reisel reports that "85 per cent of the international unions' income goes for public relations and politics and only 15 per cent for the old 'bread and butter' union activities." The total union income, exclusive of welfare and pension funds, is estimated in the hundreds of millions of dollars. The author believes that most businessmen do not wish to become involved in politics, but he thinks they must if our present economic system is to survive.

Calvert, Robert Jr. "Plant Visits—Trick or Treat?" *Personnel Administration* (Society for Personnel Administration, 5506 Connecticut Avenue, N.W., Washington 15, D.C.) Vol. 21, No. 2, March–April 1958. pp. 27–30.

More and more frequently these days companies invite college seniors to visit at headquarters if they have made a favorable impression in an initial interview. The author, who is Coordinating Placement Officer at the University of Illinois, believes that such visits should be an integral part of the recruiting process. He suggests to employers that such visits must be well planned in advance, so that the visitor will make good use of his time—not more than an eight-hour day, he advises. Reimbursements for such visits should be prompt, for obvious reasons. An introduction to conditions in the community should be an integral part of the visit. If it is known, candidates appreciate seeing where they will work and with whom. Trips to company headquarters or a major division seem to prove more meaningful than visits to smaller branches. Students appreciate knowing their status immediately following such tours. They should not be kept dangling. Mr. Calvert touches lightly on the chiseler who pads his expense account heavily or who charges complete travel expenses to four companies in the same area. These are in the minority, he thinks, but there are a few.

Harvard Business Review, Vol. 36, No. 6, Nov.–Dec. 1958.

This issue of the *Harvard Business Review,* in our opinion, exceeds the usual high standards of this journal. Almost every article is of interest to businessmen. We call your attention to three.

Margaret Mead, in "Thinking Ahead," outlines a utopian scheme for education to replace our present outmoded structure. She believes that the only way such a plan could be implemented is with the cooperation of industry. Primary and secondary education would be separated. All children would be taught the basic skills of reading, writing, numbers, money, geography, etc. A child who has no ambition, or potential beyond this stage would then start work (often at an earlier age than is permitted now). However, if ambition and potential are developed at a later age, he should be allowed to return to school for more education, suitable to his needs. In this way the high schools would be relieved of over-crowding

About the Author—

Miss Scanlan is Reference Librarian and Assistant to the Director in the Bureau of Industrial Relations of this School.

All items mentioned are on file in the Reference Room of the Bureau of Industrial Relations and may be used by visitors there. Please write direct to the publisher for any items you would like to purchase.

by the non-learners. One statement which she makes has been reproduced in italics (by HBR) and will no doubt be quoted frequently: "Thus we avoid facing the most vivid truth of the new age: no one will live all his life in the world into which he was born, and no one will die in the world in which he worked in his maturity." The author believes that only a drastic revision in our education pattern will keep us abreast of the rapid changes taking place around us.

Chris Argyris, in "The Organization: What Makes it Healthy?" presents evidence to show that even in a "good" company where "morale" and productivity are high, it is inevitable that the average worker becomes apathetic, indifferent and somewhat immature in the work situation in which he finds himself. He ceases to be interested in human rewards, but emphasizes instead material rewards. Possibly in the future we will pay increased wages and benefits for dissatisfaction. The author believes such an apathetic population cannot make the healthy foundation for a democracy. (Possibly Dr. Mead's scheme would prove to be one solution.)

F. Gordon Barry and C. G. Coleman, Jr., in "Tougher Program for Management Training," outline a program of management development introduced at the Radio Division of Bendix Aviation Corporation. It relied on case method discussions, heavy homework schedules, written reports and book reviews, and a grading system. The whole rugged schedule was an experimental departure from the mine-run of executive development programs. After the initial shock to the trainees it was felt to be of definite value to them and to the company. (Here again, we return to Dr. Mead's recommendation for advanced education for mature workers.)

King, Paul A. "Tips to Successful Discipline," *Factory Management and Maintenance* (330 W. 42nd Street, New York 36, N.Y.), June 1958. pp. 78–87.

Twenty years of arbitration decisions were studied to discover aids to good discipline. Thousands of awards, published by various reporting agencies were reviewed to produce seven "plant rules that make good sense," and "how to handle 11 common disciplinary cases." Actual examples of arbitrator's awards were chosen at random to illustrate these general rules. The author believes that an experienced arbitrator has developed a special "feel" for employee relations. He offers the rules as necessary for any company operating under an arbitration clause, which are well worth considering by all others.

Leiter, Robert D. *The Teamsters Union.* New York, Bookman Associates (34 E. 23rd Street), 1957. 304p. $5.00.

"You can't know the players without a program," and this book furnishes an excellent program for the big Conference games about to take place now that Jimmy Hoffa is president of the Teamsters Union. The first-string players are few in number: Tobin, Beck, Hoffa. Leiter sketches the history of the unions and of the three leaders. He delves into the structure of the various Regional Conferences, and here the going gets a little rough, as we become involved in the political hassles of the second-string players. Sections are devoted to the economics of the trucking industry and legislative controls; others to collective bargaining, welfare funds and the investigation of racketeering. In view of fast moving events the book is already out of date. However, it reduces fifty years of headlines to a short, factual and unemotional book, which is excellent background reading for anyone who will be involved in the future struggles for power of the Teamsters Union—and this could include us all.

Parkinson, C. Northcote. "Parkinson Looks at Retirement," *The Management Review,* (American Management Association), Vol. 57, No. 7, July 1958. pp. 58–60.

The Management Review has condensed an article from *The Economist* (London) in which Parkinson spoofs himself and us. He has worked out an elaborate eight-step formula in which he outlines the businessman's career, beginning: Age of Qualification=Q, and ending Age of Obstruction=OO. He suggests that a modern technique for ridding a company of an executive who is loath to retire is to subject him to a) air travel—frequently and at great distances, and b) the filling in of forms. It is possible to schedule trips one way around the world so that a man can have three breakfasts. The trip in reverse can result in no meals at all. Form filling should be carefully planned to give obscurity, lack of space, and the heaviest penalties for failure. Such procedures, of course, are recommended for everyone but ourselves. "It will be obvious at once that our own case is entirely different from any other case we have so far considered."

Standard Oil Company of California, Department of Organization. *People and Pay Checks.* San Francisco, 1957. 74p. $2.50. (Discount of 40% in quantities of 50 or more).

This company manual on wage and salary administration has been designed to acquaint employees at all levels with the wage and salary structures of the company. It outlines briefly the history of their development and describes step-by-step the proce-

dures for keeping these structures up to date. Two unique sections are entitled: "At Sea" and "Other Lands"—pay structures for personnel on tankers and employees in foreign countries. It is copiously illustrated with drawings, sample forms and graphs. On the whole it is one of the most interesting manuals on the subject we have seen.

The W. E. Upjohn Institute for Community Research. *Shortages of Skilled Manpower.* Kalamazoo, Michigan, 1958. 55p. No price given.

This institute is a privately sponsored non-profit research organization which was founded in 1932 by the late Dr. W. E. Upjohn for research on the causes and effects of unemployment in the Kalamazoo area. Their publications are unique, since they report careful research carried on in this microcosm in contrast to the country as a whole. This particular study examines the need and potential supply of skilled manpower in the Kalamazoo area in 1956. Twenty-seven companies, both large and small, supplied data on unemployment, recruiting methods, separation rates, quality of the labor force and effectiveness of private and public employment agencies in a tight labor market. The second half of the book stresses the need for long-range planning for training and apprenticeship programs in order to develop skilled workers in the area. It points out the almost total lack of such plans in these companies which were already suffering from a shortage of such workers.

ARE YOU A GOOD MANAGER?

ANN ARBOR—Here's a fast way to figure how much of a manager you are.

A University of Michigan publication suggests you simply ask yourself how much of your working day is spent on all of these tasks combined:

1. **Determining goals for your work group.**
2. **Establishing and interpreting policy.**
3. **Scheduling work for your group.**
4. **Developing procedures for getting the work done.**
5. **Budgeting money, people, equipment and supplies to do the job.**
6. **Organizing work to be done under your direction.**
7. **Delegating authority and responsibility.**
8. **Establishing working relationships between your subordinates.**
9. **Selecting new members for your organization.**
10. **Paying your subordinates fairly for their work.**
11. **Communicating up and down your organization.**
12. **Helping subordinates develop managerial skills.**
13. **Setting standards for performance.**
14. **Checking performance against the standards.**
15. **Seeing that there are records and reports of work done.**

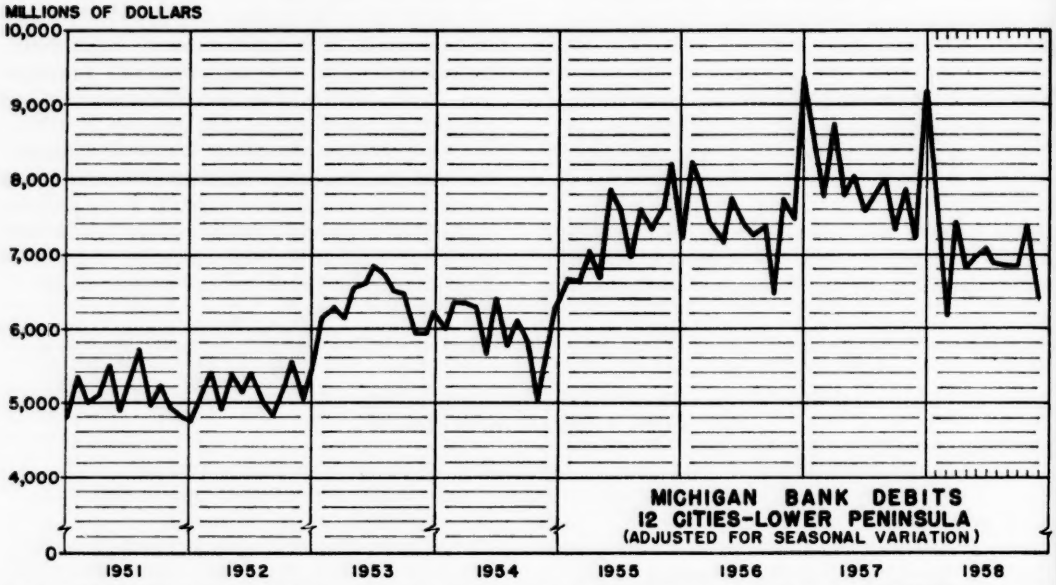
These are the activities which distinguish management from other types of work, according to Louis A. Allen, president of Louis A. Allen Associates, *Palo Alto, Cal.,* management consultants.

For the president, or top manager, they're practically a full-time proposition. But managers at all levels are also concerned with *operations*—actually getting the work done. The further down the management ladder you are, the more you're concerned with operations. Foremen and others on the "firing line" (or first level of management) spend about half their time managing, and half operating, Allen estimates.

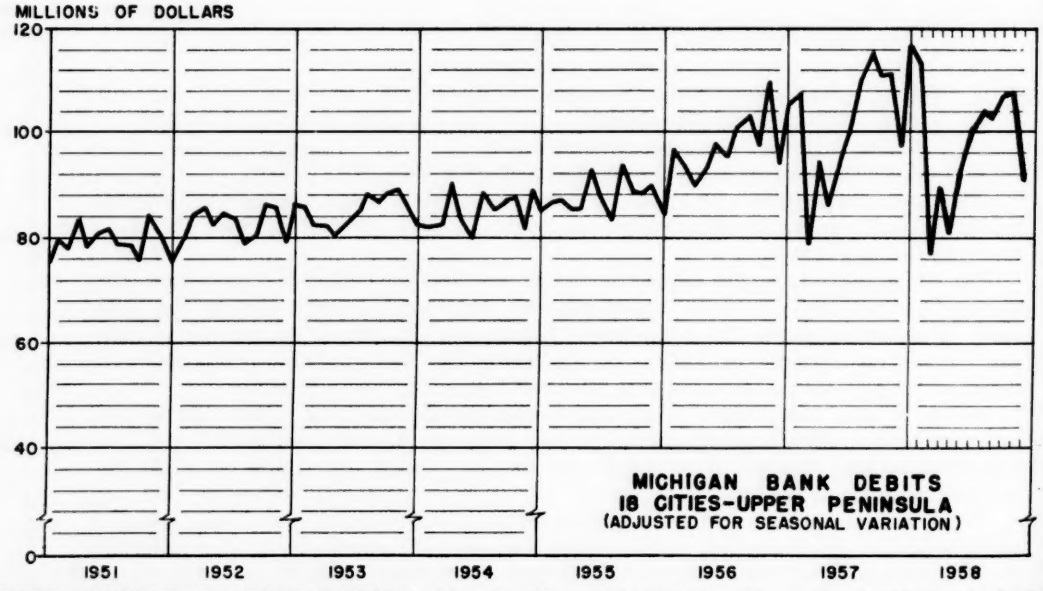
So there you are. Figure your own percentage—leaving out coffee breaks—and compare it with these standards. Better yet, compare it with your colleagues. And remember if your boss has time to take the test . . . . well, there's still room for him to move up in the organization.

Want to learn more about management? If you want to learn more about management appraisal, get a copy of "Addresses on Industrial Relations—1958," just published by The University of Michigan Bureau of Industrial Relations (271 pp. $4.50, paperbound). It includes articles by Allen and 14 other executives.

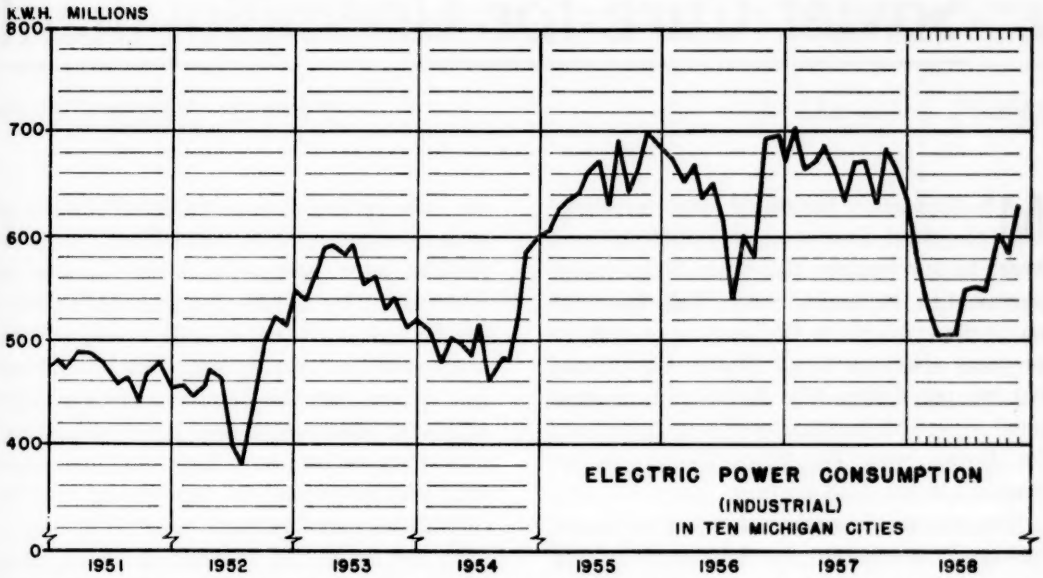
Michigan Business Indicators



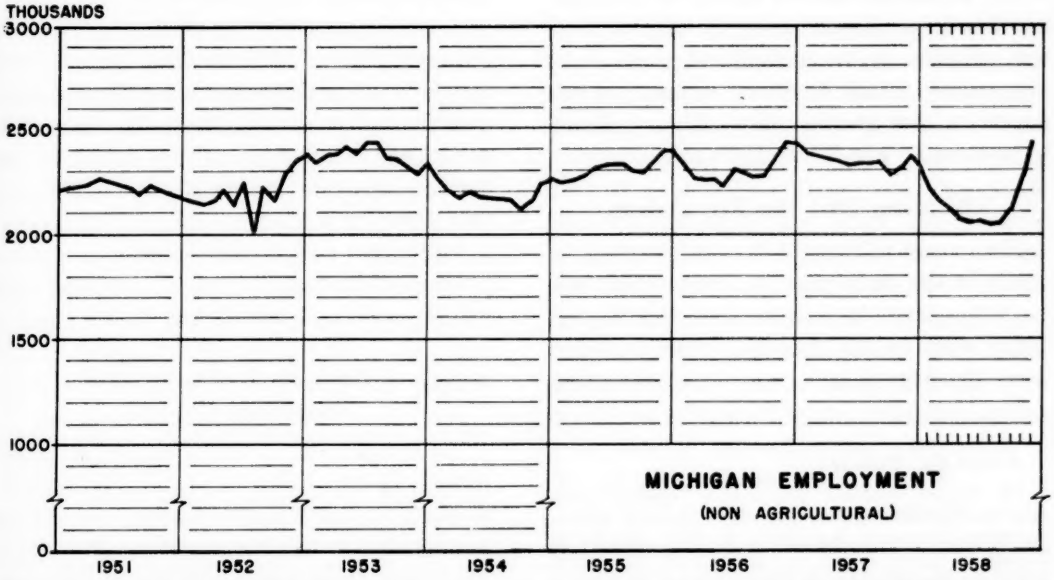
BANK DEBITS—THE MOST ALL INCLUSIVE MEASURE OF BUSINESS ACTIVITY—Lower Peninsula bank debits reflected the rising trend of economic activity in October but fell off sharply in November. This is probably the result of the drop in available banking days in November, i.e., the several holidays, including Election Day, and the occurrence of five week ends in the month.



UPPER PENINSULA BANK DEBITS—After leveling off in October Upper Peninsula bank debits declined sharply in November, probably for the same reasons which caused Lower Peninsula debits to fall off.



POWER CONSUMPTION—Increased production explained the continued rise in Industrial Power Consumption in November after a slight dip in October.



MICHIGAN EMPLOYMENT—Total employment of wage and salary workers continued upward in October and November. The bulk of the rise in November (121,000 workers) resulted from the recall of employees who had been temporarily unemployed due to labor disputes.

• *A factual appraisal of Krushchev's boast*

Soviet Cure for Unemployment

Thomas Nixon Carver

MR. Krushchev has seized upon our unemployment figures as an opportunity to boast to our workers that there is no unemployment in the Soviet Union. Well, there was no unemployment in England for a number of years after the Black Death had thinned out her population. The Red Death of communism in this century seems to have done for Russia what the Black Death did for England in the 14th century.

The communist policy of trying to create universal satisfaction by killing everybody who was dissatisfied had a political purpose, but its economic results may be even more important than the political. That policy may have helped to solve—in name at least—Russia's unemployment problem.

Mr. Krushchev did not discuss the question whether an employed person in Russia is as well off today as an unemployed person is in this country. Until American workers get the answer to that question they will do well not to be lured by Mr. Krushchev's bait.

Thinning Out the Population

How many millions of Russians starved to death in the early years of communism will probably never be known. It is not known today even in the Kremlin. Other millions were slaughtered in a series of purges that are still continued on a diminishing scale in such satellites as Poland and Hungary. Other millions have been sent to slave camps in Siberia or other distant provinces. It is doubtful if it is accurate to call those millions employed. Even if they are, their banishment has thinned out the population in the older and more populous parts of the Soviet Union. Still other millions have fled from Soviet tyranny seeking refuge and *employment* in other countries—including ours.

If you could add together all the unnumbered millions who starved (not because there was no food but because it was denied to noncommunists), all those who were murdered in various purges, all those who were sent to slave camps, and all those who fled to other countries for *employment* and safety, you would be justified in wondering if any of the great plagues of history had done a more thorough job of thinning out populations than communism has done in Russia. You certainly would not wonder that there should be no unemployment in Russia if it is really true that there isn't any.

You might well wonder if full employment is worth what it costs if it has to be purchased at such a price as Russia has had to pay.

Absorbing Refugees and Supplying Capital

No comparison of the numbers of unemployed in the U.S.A. and in the U.S.S.R. would be fair unless we take into account the immigration to this country since World War II. When these are added to the refugees from Soviet tyranny who came during that

(continued on page 24)

About the Author—

Dr. Carver, Professor Emeritus of Political Economy of Harvard University, was President of the American Economic Association in 1916. He is the author of many books and the holder of several honorary degrees. Now in his 94th year, he lives in Santa Monica, California, where he and Mrs. Carver celebrated their 70th wedding anniversary on May 4, 1958.

• *A realistic analysis of the key questions*

Rubber Problems in Latin America

D. Maynard Phelps

THERE has been considerable interest recently in the expansion of natural rubber production in Latin America. People have talked about rubber's return to the Western Hemisphere and of Latin America as the "prospective area" for natural rubber expansion, and "the future source of supply" for the Western Hemisphere. The reasons for this interest are not difficult to adduce. They stem back in part to our experience with rubber during World War II. It is not an overstatement to say that we might even have lost the war if synthetic rubber had not been developed quickly. At least we were extremely vulnerable, with the supply source for natural rubber halfway around the world and in the hands of our enemies.

This condition of dependency on the Far East, the steady advance of Soviet encroachment toward the rubber producing areas, and the possibility of a third world war make us still vulnerable, if we must have natural rubber. At least these factors have directed attention to other possible areas of supply.

Another factor of significance is the tremendous increase in the demand for rubber in the Latin American countries themselves, particularly in Brazil, Venezuela, and Colombia. As late as the end of World War II, some countries, particularly Brazil, were in surplus operation. They produced more rubber than they needed for manufacturing operations. Now, because of their increased requirements, they must import rubber; and it takes foreign exchange—often badly needed for other imports. For instance, Brazil needs to conserve foreign exchange in every possible way because of a chronic shortage. As a result, there has been a strong desire to secure a domestic rubber supply, and to become self-sufficient. Thus continuing vulnerability—the possibility that supplies might again be cut off by enemy action; the increasing deficits of rubber, especially in Brazil; and the need to conserve foreign exchange are the principal factors which have prompted attention to the expansion of natural rubber output in the other Americas.

Two other factors of lesser importance are probably involved also, namely, a feeling that Latin America can now compete in rubber production with the Far East on a more favorable basis than formerly; also a feeling that it is somehow incongruous for Latin America, especially for Brazil, the home of natural rubber, to import supplies from the Far East which had "appropriated" rubber from Brazil under somewhat dubious circumstances about a half century ago. As a result of these factors and others, there has been considerable interest in the feasibility of the expansion of natural rubber production in the other American republics.

In view of the conditions just mentioned, should those Latin American countries which are climatically suited for rubber production strive to increase output? The answer to this question is difficult indeed. It leads us to other

About the Author—

Dr. Phelps, Professor of Marketing in this School, has had long experience in Latin America. This article is based on his recent book, *Rubber Developments in Latin America,* published by Bureau of Business Research of this School (1957, 174 pages, $5.00). He went to Brazil in 1954 to secure material for this study, which was initially made for an assignment of the Organization of American States.

questions, among them (1) What is the world demand and supply situation for rubber? (2) Is demand expanding, and if so, how rapidly? (3) What is the demand and supply situation in Latin America? (4) Is economic growth in prospect which will make the importation of rubber a yet greater burden on foreign exchange earnings? (5) Can natural rubber compete successfully with the synthetics, now and in the future? (6) Is the expansion of natural rubber production essential for security in the Western Hemisphere? (7) If the expansion of rubber production is desirable in Latin American countries, can they do it? These are the questions which will be discussed in this short article.

Rubber Supply and Demand Situation

The use of rubber in the Twentieth Century has grown at an almost unbelievably rapid pace. During the period of 1900–55, the average annual increase in consumption has been 7.6 per cent. In the United States it has been 8.2 per cent—in all other countries combined, 7.1 per cent. The physical quantity produced in 1900 was a mere 20,300 tons. In the period 1950–55, it averaged 2,930,000 tons annually. During the 1950–55 period, the average annual rate of increase was 5.1 per cent. For the United States the figure was 4 per cent; for all other countries combined, 6.4 per cent.

If we project total consumption from 1955 on at a rate of 4 per cent, one which seems reasonable in view of past experience, the world would be using 4,400,000 tons by 1965 —a very substantial increase over present consumption. In summary, these data strongly suggest that rubber consumption will continue to increase rapidly for some time to come, barring a lack of supply, which seems extremely unlikely, or a world-wide depression; that it will increase but at a decreasing rate, particularly in the United States, and at a higher and more sustained rate abroad. This variation in rates of increase is not surprising in view of the fact that annual consumption in the United States is about 19 pounds per capita, in contrast to one pound for all other countries combined.

Supply of natural rubber cannot increase much by 1965, for new plantings or replantings of old orchards have not been in large amounts. Moreover, it takes about seven years for a tree to begin bearing, and its peak of output is not reached until a number of years later. In 1956, a total of 1,887,000 long tons of natural rubber were produced. An outside estimate for output in 1965 is 2,000,000 tons. Therefore, it is highly probable that over one-half of all rubber consumed throughout the world in 1965 will be synthetic rubber. In other words, production of the synthetics is the only way to meet increased demand in the years immediately ahead.

Present capacity for synthetic rubber production, in addition to that now definitely planned, should provide for all likely needs at least through 1962, but more capacity will then be needed. It takes only about two years to build a synthetic rubber plant, so as more rubber is needed, it will be forthcoming. Yet the situation is not an unhealthy one for natural rubber, if it is efficiently produced. Barring a world-wide depression, there is little likelihood of a surplus of natural rubber as there has been, at times, in the past. Solely from the point of view of the over-all world demand and supply situation, Latin America should not hesitate in expanding natural rubber production. Natural rubber is not likely to be a cheap commodity in world markets for some time to come, barring a substantial depression.

Supply and Demand Situation—Latin America

Now let us look at the supply and demand situation in Latin America. In recent years Latin America has produced about 30,000 tons of rubber annually, only a small fraction of world output. Even during the war years when strenuous efforts were made to increase output, average annual production was only 43,000 tons. Consumption of rubber is presently about 100,000 tons annually, and the

rubber content of imports is estimated at 20,000 tons. Therefore, the actual annual deficit is in the neighborhood of 90,000 tons. Brazil went from a surplus of 11,000 tons in 1947 to a deficit of 18,000 tons in 1955. Undoubtedly, although foreseeable, the need for importation of rubber was a shock to the country.

The rubber industry in Latin America has grown with tremendous rapidity in recent years. The first tire factory in the other Americas was established in Mexico in 1925. Now nine countries have tire industries. In total, there are twenty-nine companies involved, of which nine started operations since 1950. In Venezuela three of four companies were established in one year, 1955. Six American companies and three European companies have participated in this development either through full ownership or joint participation with nationals of countries in which plants are located.

The reason for this tremendous growth recently is the growth of motor vehicle registration and use. From 1946 to 1955 registration increased two and one-half times—from 1,022,528 to 2,605,474 vehicles. Brazil's registration almost tripled during this decade, Cuba's quadrupled, and Venezuela's increased almost six times. This means a very large increase in tire use, particularly so because the number of tires used annually per motor vehicle is about half again as much as in the United States. One reason for this greater use is the much larger proportion of trucks and buses in the total registration. It is about one-half in a number of countries compared to about 15 per cent in the United States.

Now Argentina and Brazil are rapidly developing automobile industries. In Brazil, General Motors, Ford, International Harvester, Studebaker, and a number of European companies have all started motor vehicle manufacture under a plan in which they commit themselves to increase that part of the vehicle produced in Brazil to 80 per cent (in weight) over a period of five years. As a result, many of the large American parts manufacturers have established manufacturing plants in Brazil likewise. An editorial in *Brazilian Bulletin* (September 15, 1958) stated that a total of 23,400 vehicles were produced in the first half of this year. With national manufacture will come increased registrations and more demand for tires and other rubber products, almost inevitably. It has been estimated that Brazil will need 85,000 tons of rubber annually by 1960 to meet the demands of the rubber manufacturing companies. While this figure seems high, nevertheless there can be no doubt about the rapid increase in demand as time goes forward.

Natural vs. Synthetic Rubber

With the demand and supply situation in mind, we now turn to the question of whether any country should try to expand natural rubber production in view of the competition offered by the synthetics. There was no more dramatic economic episode in World War II than our struggle to develop synthetic rubber. From a production of 8,383 tons in 1941, output was increased to 820,373 tons in 1945. Since that time there have been many important developments in synthetic rubbers. The development of cold rubber, oil-extended rubber, and more recently, a synthetic with the true molecular structure of natural rubber are all noteworthy. This new rubber has all the physical properties of natural rubber, even tack and stickiness. It is now being produced in pilot plants, and probably could be produced in quantity, and at prices competitive with the prices of natural rubber in most years since the end of World War II. The development of this synthetic rubber was an epochal event in the rubber industry, and in the security of the Western Hemisphere.

Research in the synthetics has gone forward at an accelerated pace since the plants were turned over to private ownership in April, 1955. Both the present status of synthetic rubber and the further research which will undoubtedly be done assure us that the condition of vulnerability which previously prevailed has now been removed.

Synthetic rubbers have many advantages over the natural product. They are more uniform, better packaged, cleaner, easier to process, more versatile, and in many uses have better wearing qualities. Now over one-half of the rubber which we use in the United States is synthetic. From the point of view of preference alone, divorced from price, only 27 per cent of the rubber used (by weight) would be natural rubber, 38 per cent would be synthetic, and for the remaining 35 per cent, it would be simply a matter of relative price, according to one authority.[1] Thus for about one-third of the needed supply it is simply a matter of relative price, and this goes back to cost. It is difficult to get cost data, either for natural rubber or for the synthetics. Under the best of producing conditions, rubber grown in the Far East cannot be delivered in London or New York for much less than 14 cents per pound. The range of cost per pound reported by *The Economist* for 1952–53 was 11.2 cents to 24.7 cents for different Malayan plantations.[2] The costs of producing on plantations in Africa may be considerably less. Furthermore, there is hope of reducing costs by planting high-yielding strains which are now available.

On the synthetic rubber side, standard GRS is being produced for somewhat less than 20 cents per pound, probably 18 cents to 20 cents, and the oil-extended rubbers for considerably less. Moreover, the private companies have improved processing methods since they took over the synthetic rubber industry and have probably reduced per pound costs. While these data on costs are suspect, it is likely that the natural products still have a slight competitive edge on a cost basis. Yet neither natural rubber nor the synthetics can be counted out in the competitive struggle now being waged, for in some uses synthetic rubbers are definitely preferred. The sheer fact of the matter is that we will have to have both types of rubber to meet growing world demand. Even if the natural product does enjoy a slight cost advantage, output cannot be increased much in the next few years. Therefore, from the point of view of relative cost, natural rubber vs. the synthetics, there appears to be no strong argument against the expansion of natural rubber in the other American republics.

Yet it should be recognized that the situation has been profoundly changed since the development of the synthetics. There are no real obstacles to the growth of synthetic rubber capacity. The motivation for making the synthetics even more competitive with natural rubber is strong and, particularly so, because the industry is now in the hands of private concerns, mostly in the rubber, petroleum, and chemical industries. The rubber companies have always wanted greater control over the supply and cost of their principal raw material in order to be more sure that supplies would be available when needed and to attain a greater measure of price stability. Now the American rubber companies, for the first time, have it within their power to attain these objectives. It is probable, therefore, that drastic price increases in natural rubber will soon be a thing of the past, and desirably so, for too much price instability is unhealthy for everyone concerned.

The Question of Security

In view of the developments in the synthetic rubbers, and the possibility of increasing output substantially, when necessary, the United States is no longer vulnerable in reference to an adequate rubber supply. We also have a large stockpile of natural rubber, one of about 1,200,000 tons. Informed people in the rubber industry believe that this stockpile can be substantially reduced without endangering the security of the United States. The enabling legislation, Public Law 520 of 1946, however, makes disposal of rubber from the stockpile exceedingly difficult.

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[1] J. N. Street, Director of Laboratories, Firestone Tire & Rubber Co., "Technical Requirements," a paper presented at the 39th Annual Meeting (November 22, 1954), Rubber Manufacturers Association, Inc., New York.

[2] "Rubber in Balance," *The Economist*, Vol. CLXXIV, No. 5822 (March 26, 1955), p. 1118.

Latin American countries are in a different position than the United States. Most of them cannot afford a stockpile like ours and, as yet, they have no synthetic rubber industries. If an emergency did arise, under present conditions they would have to rely largely upon our stockpile and synthetic rubber industry to furnish them the supplies which they would need. Under these conditions a "living stockpile," i.e., through the development of natural rubber plantations, may be the best way to get the security which they desire. At least, self-sufficiency in rubber seems desirable to them, and it might possibly be obtainable in time in Brazil, Colombia, Peru, and some other countries.

Rubber Expansion Programs

Now we turn to the final question, i.e., can the countries which are climatically suited to rubber production expand output? Undoubtedly, Brazil is the key country so let us look at the situation there. The Ford Motor Company started to develop plantations in Brazil in 1928. Henry Ford wanted to grow his own rubber to be free of the rubber control of the British and Dutch in the Far East, which apparently irked him greatly. The Company established a plantation of 7,500 acres up the Amazon River which came to be known as Fordlandia, but the trees were almost completely defoliated by the South American leaf blight. The Company tried again with 16,900 acres on the Tapajós River south of Santarém. It was thought that the leaf blight would not be a problem there, for the land was at greater elevation and better aerated. But in 1938 the trees, some 2,000,000 of them, were also attacked; and complete failure was only averted by a crown-budding procedure. This means that the trees were cut off at the seven foot level and crown-budded with disease-resistant clones. Later both plantations were sold to the Brazilian Government for a reported $250,000.

In contrast, the Firestone Tire & Rubber Company, in 1924, established a plantation in Liberia at Harbel, which has been a very successful operation. The plantation covers 85,000 acres, employs about 30,000 people, and produces around 30,000 tons of rubber annually. There has been no trouble with the leaf blight which, together with a shortage of labor, were the principal deterrents to success in Brazil.

At the Belterra and Fordlandia plantations the Brazilian Government has done very little except some plant breeding work. It is doubtful whether these two plantations will ever be reactivated and become important rubber producing centers. The only positive action of importance, after the failures of the Ford plantations, was taken by the United States Department of Agriculture through cooperative research programs with nine Latin American countries (15 initially) in an attempt to overcome the leaf blight. A three-dimensional tree was developed through bud-grafting which combined a natural base, a high-yielding panel, and a disease-resistant crown. The development of this tree was not a real solution to the problem, however, because the process was too difficult and expensive for commercial use, the grafted trees were actually not very sturdy, and the dry rubber content of the latex was not as high as expected. The basic problem was to get the right qualities in the seed and, as time went forward, considerable progress was made toward this end.

While the technical problem apparently has been largely solved, little progress has been made until recently in the development of plantations, anywhere in Latin America. As late as 1952, in all of Latin America there were only 37,000 acres of commercial plantings, which is a very small acreage indeed. However, in the past few years some progress has been made in Brazil. The Brazilian Government, through an official decree, required the rubber companies manufacturing there to utilize 20 per cent of their annual profits for developing plantations, or to loan an equivalent amount to the Government for that use. The rubber companies objected to the provisions of the decree because it constituted forced investment in a risky enterprise. More-

over, the decree may have been unconstitutional, but its constitutionality was not tested. After negotiation, an agreement was reached on a considerably modified basis whereby the companies agreed to establish plantations of about 10,000 to 12,000 acres each, and they proceeded to do so beginning in the middle of 1953—Goodyear and Cia. Platense de Neumaticos, S.A. (Pirelli) near Belem at the mouth of the Amazon, and Firestone near Ituberá on the coast some 200 miles south of Salvador in the state of Bahia. Both Dunlop Tire & Rubber Company and General Tire & Rubber Company, in conjunction with local capital, have established factories in Brazil since the decree was issued and presumably will have to establish plantations also.

It is a matter of question whether the rubber companies would have established plantations if the Brazilian Government had not taken the positive action noted. Perhaps there was no acceptable alternative if the companies wished to protect their investments in manufacturing facilities in Brazil. There was a possibility, of course, that investments in plantations would be profitable as time went forward. In any event, the decision was reached to cooperate with the Government in its attempt to induce natural rubber production, but not to the extent required in the initial decree.

The Outlook

To a limited extent, therefore, rubber has now "returned to the Western Hemisphere." This means that one country, Brazil, has moved definitely toward more rubber production. A minimum of 30,000 to 35,000 acres has been or will be planted and probably considerably more. If these new plantations demonstrate that rubber can be produced successfully, many small farmers in Brazil may plant rubber trees. At least, the development of small holdings followed plantation development in both the Far East and in Liberia. Furthermore, success of plantations in Brazil will, in all probability, encourage plantings in other Latin American countries.

While the recent developments in Brazil are undoubtedly encouraging to those people who wish for self-sufficiency in rubber or, possibly, to those who believe that Latin America should be the source of natural rubber for the Western Hemisphere, any such expectations are in the realm of fancy. In view of the very rapid increase in demand for rubber, these new plantations and small holdings will not even meet the probable demand in Brazil for the foreseeable future—to say nothing of export. The fact of the matter is that there is not the necessary labor available, the necessary capital for a risky enterprise, or willing and able management to produce large quantities of rubber in Latin American countries. There is not even complete assurance that technical difficulties have been fully overcome, that the leaf blight is fully under control. If Latin American countries want to be self-sufficient, they must turn to synthetic rubber as soon as their levels of demand permit production at reasonable costs. By this means they can attain self-sufficiency, conserve foreign exchange, and provide a solution to the security problem. The first steps in this direction are now being taken by Brazil, which has announced that a synthetic rubber plant will be established near Santos in the near future.

THOSE YOUNG PEOPLE!

"Our young people have been corrupted by luxury; their manners are bad and they are contemptuous of authority . . . They no longer rise when their elders enter the room. They contradict their parents, chatter in the presence of guests, wolf their food, and tyrannize their teachers."

. . . . Socrates—400 B. C.

• *Some succinct and stimulating suggestions*

What This Country Needs Is . . . .

R. W. Storer

1. *What this country needs* has changed enormously since the days of the 5-cent cigar, if we are to believe the many voices which are prescribing for the economy today. It seems to this observer that the country needs what it has always needed, and that the changes have been more in complexity of detail and in applications than in principles. The current popularity of this pastime and the contradictory nature of many of the prescriptions give the writer an excuse to join the game.

2. We need an awareness that no government can itself stabilize an economy without ultimately telling people what they must and must not do in their economic lives. Since we shrink from any such delegation of powers, we must individually assume some responsibility for the collective consequences of our individual economic actions. Whatever trouble we are in is of our own making and we cannot look primarily to the government to get us out of it. Recovery will come about from the *collective* results of individual decisions and actions. Government can establish the *climate* within which these decisions and actions are taken. Beyond that point is highly controversial.

3. We need a widespread understanding in all walks of life, of the monetary mechanisms which link together debts, bank deposits, wages, profits, prices and production.

4. We need to maintain and then expand the quantity of loans and investments held by the banking system, for upon these directly depends the volume of bank deposits, the flow of which constitutes the nation's purchasing power.

5. We need also to improve the *quality* of some of this debt, lest the drop in business, and in earnings impair the debt and the credit past all usefulness to lender or borrower.

6. We need, therefore, to induce new buying by persons and businesses who would not otherwise buy, who will not have to borrow excessively to buy, who will not have to reduce their holdings of cash to dangerously low levels in order to buy.

7. We need, in order to interest these buyers, new economic values that will appeal to them. In consumers' goods such decisions are highly subjective—"beauty is in the eye of the beholder." We (all of us) need, therefore, to appeal to consumers (all of us) with new products or new services, offering new utility, convenience or economy, in new parts of the community, of the region or the nation.

8. We need to be alert in recognizing, in what we offer to the public, that the consumer is a collective economic king. We need to understand that his buying motivations change, and that *economy* in operating and maintenance costs of all his durable goods is growing in relative importance.

9. We need, as the obvious parallel, new capital investment in the *means of producing* these new values, production techniques, so much better and cheaper than at present, that the savings created by their use will clearly justify building them *now* and dismantling the

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highest-cost capacity now in use. We need to continue research and development and to carry them through to the kind of end-products described above.

10. We need to develop—or to recall— certain applied insights into economic realities; that the *long-term* growth of the economy is at a lower rate than many of us have assumed from the *cyclical* rise since 1945, and that planning should take this into account; that margins for error and for business contingencies should be at a maximum, rather than a minimum, in times of boom.

11. We need to balance the urgency of emergency programs by the Government against the observed fact that the spending inevitably involved in these promptly takes on the characteristics of crabgrass. Vested interests quickly develop in the spending and thus indirectly in the perpetuation of the emergency which required it.

12. We need to know and to act on the knowledge, that it is as important in slack times as in good, as important to labor as to capital, to keep on raising our productivity per man-hour; that in the long run higher family real purchasing power and living standards can come *only* out of this. And today is part of the long run.

Soviet Cure for Unemployment

(continued from page 16)

period, numbers for which we had to furnish employment, it is difficult to see what Krushchev had to brag about.

While the refugees and regular immigrants were increasing our supply of labor, we have also been donating and lending capital to countries that had been devastated by the war. The natural effect of this was to deplete our supplies of capital that were needed to expand our industries and employ more labor.

Looked at from any angle it seems that we have done pretty well in the way of employing labor.

OPPORTUNITY

They do me wrong who say I come no more,
When once I knock and fail to find you in;
For every day I stand outside your door,
And bid you wake, and rise to fight and win.
Wail not for precious chances passed away,
Weep not for golden ages on the wane
Each night I burn the records of the day;
At sunrise every soul is born again.

—Walter Malone (1866–1915)

• *High rates cause exemptions, and vice versa*

Erosion and Taxes

Paul F. Icerman

MARCH 1, 1958 marked the 45th anniversary of the Federal income tax. During these 45 years, the income tax has financed two world wars, the Korean War, and is presently supporting the most expensive peace-time armament budget we have ever seen. There is no question that the progressive income tax has proved to be the most ingenious and efficient means yet devised of extracting money from the taxpayer. Apparently, it meets the test of good tax law in that the "feathers are plucked from the goose with the least amount of hissing."

When the adoption of the 16th amendment to allow Congress the power to enact an income tax was being debated, some apprehensive citizens pointed out that there was nothing in the amendment to prohibit Congress from levying taxes for as much as 10 per cent of income. Proponents of the measure reassured these people, asserting that Congressmen who voted for such a confiscatory tax would be committing political suicide, and therefore there was no possibility of these rather ridiculous apprehensions coming to pass.

Then and Now

In 1914, the government received $71 million from income taxes. After liberal exemptions, the 1913 rates levied a tax of $60 on a married man with two children who had income of $10,000. If income was $25,000, the tax was $260. There were 358,000 citizens fortunate enough to have income requiring the filing of a tax return. The first statute to levy an income tax consisted of 25 pages divided into 21 sections.

Contrast the 1913 situation with the present rates, which are down slightly from the wartime peak. Personal exemptions are at $600 per person. Amounts over the exemptions are taxed at the lowest rate of 20 per cent. High incomes can reach a top layer rate of 91 per cent. A married man with two children now pays $1,592 on income of $10,000; and pays $6,268 on an income of $25,000. Nearly sixty million Americans file returns, which are administered by more than 50,000 employees of the Internal Revenue Service. The present Internal Revenue Code totals more than 800 pages, divided into some 2,000 sections.

Both political parties and probably all of us taxpayers are in favor of across-the-board tax reductions. However, chances are that there will be no tax relief of this kind. The obvious explanation is the fantastic size of the national budget, coupled with the fact that in only two out of the last ten years has the government operated within its revenues. However, the underlying reason is something else, namely, *erosion of the tax base.*

Non-Taxable Income

Although national income has been rising during the past ten years, tax revenues have not kept pace, even though the rate structure has not been changed very much. Representa-

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tive Mills, chairman of the Ways and Means Committee, is quoted by *Business Week* as saying, "More personal and business incomes should be put back under the income tax laws." He estimated that the rates could be cut by perhaps 40 per cent if the taxable income base were restored to the original concept implied in the income tax amendment to the Constitution.

In 1957, total personal income was estimated by the Department of Commerce at $343 billion, of which about $137 billion was taxed, and $206 billion escaped the tax collector. Let's take a look at some of the provisions which allowed 60 per cent of personal income to be untaxed. First there are the exemptions of $600 per person, and for those over 65 and the blind, $1,200. Then there are the ordinary deductions, some of which have been in the tax law for many years, others not so long. It has been my experience that most taxpayers have a higher regard for deductions than for any other figures entered on their returns. These include a subsidy to religious, charitable, and educational organizations through the allowance of deduction for gifts to these groups; taxpayers in debt are allowed to deduct interest; state and local taxes are deductible; and since 1943, medical expenses have been allowed as deductions. All of these shrink taxable income yet have no economic significance as related to income production. To cap it all, moreover, we have the so-called "standard deduction." It places a floor under deductions to allow all persons to deduct 10 per cent of their income (up to $10,000), without regard to their actual expenses in the above categories.

Special Deductions and Credits

In addition to the deductions cited above, which have more or less general application, there are deductions and credits available to special groups. Examples are percentage depletion on income from natural resources, dividend credit and exclusion, child care deduction, exclusion of interest on state and municipal bonds, reduction in rates on capital gains, exclusion of social security payments, retirement income credit, exclusion of employers' payments to pension funds and other fringe benefits, and many others.

These special privileges themselves are a product of high tax rates. For one reason or another, Congress has seen fit to alleviate the tax burden by granting concessions to various groups. However, Mr. Mills points out that, "The high rates bring requests for relief, but every time we grant special treatment, we make it harder to reduce rates."

If all of these provisions granting relief applied to all taxpayers in such a fashion to bring about uniform reduction, no one could complain about our present system. Unfortunately this is not the case. Each inequity that is adjusted brings about new inequities. Each group that secures special treatment is followed by another, whose case is furthered by the group which has gone before. The pressures on Congress and the tax writing committees are too strong to be resisted.

How to Reverse the Trend

I can see no reversal of this trend until some of us are willing to oppose bills of which we are the principal beneficiaries. The voices raised against special privileges affecting others are not heard if at the same time they are loudly demanding benefits for themselves. It seems that we regard special privileges for others as "loopholes" and those for ourselves as "corrections of inequities."

The course of action that I have outlined is not an easy one. Let me use my own profession as an illustration. In the summer of 1956, the Tax Committee of the American Institute of Certified Public Accountants held a three-day meeting in Chicago. The committee considered matters of tax policy and adopted a resolution calling for a bipartisan commission to make a thorough study of the Internal Revenue Code and to provide the Congress with recommendations for changes. In October the committee chairman held a press conference in New York, during which he enumerated many of the special treatment items,

called for an end to this type of law-making, and announced the action of the committee in voting for a commission. This was publicized in financial journals and some other papers.

While still glowing with pride at our statesman-like approach, I received a letter from the executive committee of the Institute addressed to all members urging active support of the Jenkins-Keough bill. This bill would allow self-employed taxpayers to set aside (and deduct) sums to be invested in personal pension plans. The proceeds would be taxed as they are used after retirement. The theory of the bill is to allow the self-employed to create for themselves tax-sheltered plans like those set up by employers for the benefit of their employees. In July of this year, this bill was approved by the House. The official estimate of revenue loss was $360 million, although some of its proponents estimated the loss to be nearer $100 million. It did not pass the Senate; thus the bill is dead for the present.

The *Congressional Record* indicates that only one Congressman (Byrnes of Wisconsin) spoke in opposition. He said: "The people who will get the real advantage and the real tax break under this proposal are those in the extremely high income tax bracket. It is this group that can avail itself of the program, and it is this group that will benefit most by the postponement of the income-tax liability from a period of high surtax-bracket rates to a period of lower income and lower surtax-bracket rates. I will be the first to recognize the hardships and the inequities resulting from the extremely high progression in our income taxes. In fact, it is extremely high tax rates that are at the heart of this and many other problems which we face.

"Let me remind the House that tomorrow the Committee on Ways and Means will hear the Secretary of the Treasury on the recommendation of the administration for an increase in our national debt limit by approximately $10 billion. There is no question but what the debt ceiling will be increased by the Congress within the next two weeks. When we face such a situation, I wonder if it comes with good grace for this Congress to give a special tax advantage to a special group to the extent of $360 million a year. For my part, I would approach such a question with great timidity . . . ."

The Real Problem—High Rates

Congressman Byrnes continued, "But let me come to this point, which I think is of particular importance and which I think we have to face up to eventually. The problem here of inequities that we try to meet piecemeal all have at their heart our very high tax rates today, and particularly the very high progressive rates. That is where the burden comes, and that is the basic burden you are trying to relieve here. Unless we make a frontal attack on these rates, we are going to get our tax code in such a hodgepodge and jumble that nobody will be able to figure it out, and there will be inequity piled upon inequities. We have them today. This bill tries to take care of one inequity, yet by doing so it is going to create some other inequities. You cannot help but have that kind of situation when you try to meet all these little special cases by special legislation.

"Mr. Speaker, I would suggest that as we take special action and we give special tax exemptions or special tax credits or special tax deferments and reduce our revenues little by little, in that way we just postpone the day when we can get to the heart of this problem. We postpone the day when we can give tax relief across the board and tax relief directed against the rates. When I view the matter, Mr. Speaker, from that angle, it just seems to me that the situation we are in at the present time makes it very questionable as to whether we are doing equity and justice to these people primarily affected by this bill but also to all of our people and, yes, even to generations yet to come. In order to treat them equitably, I think it would be well to put aside this bill at this time."

According to Mr. Keough, the sponsor, the

bill is the "culmination of many years of hard work by and on behalf of an imposing and respectable list of national, state, and local professional parties and organizations of business men." I daresay that these same respectable organizations are also in favor of tax rate reductions and an end to the granting of special privileges.

THE CHALLENGE OF SOVIET EDUCATION

Excerpts from a speech by Dr. Lawrence G. Derthick, U. S. Commissioner of Education, to the National Press Club, Washington, D.C., June 13, 1958.

We have just returned from a month-long study of the schools in the U.S.S.R.

What we have seen has amazed us in one outstanding particular: We were simply not prepared for the degree to which the U.S.S.R., as a nation, is committed to education as a means of national advancement . . . .

The importance of science in Soviet education is a matter which is unquestioned. Biology, chemistry, physics and astronomy are required of every pupil regardless of his individual interests or aspirations . . . .

We witnessed an education-centered economy—planned, and developing in stages, with the emphasis upon the collective rather than the individual needs of the people . . . .

Direct comparisons of the quality of education in two countries as different in goals and aspirations as the United States and the Soviet Union are difficult, if not impossible . . . .

Everywhere in Russia there were evidences not only of passionate love of country but a burning desire to surpass the United States in education, in production, in standard of living, in world trade—and in athletics.

The slogan we saw most in posters, films and everywhere was "reach and overreach America." We did not find among children and teachers any evidence that this fierce sense of competition was other than of peaceful intent.

In education the spirit is a race for knowledge, for supremacy in a way of life and in world leadership. The Russian attitude is, as one Soviet official told us, "We believe in a planned society, you in individual initiative. Let time tell."

They are convinced that time is on their side and they can win world supremacy through education and hard work.

This conviction is basic to all of their efforts and all of their plans for the future. Education is paramount. It is a kind of grand passion—this conviction that children, schools and hard work will win them their place in the sun, and on the moon.

Like a People at War

We are today in competition with a nation of vast resources, a people of seemingly unbounded enthusiasm for self-development and fired with conviction that future supremacy belongs to those with the best-trained minds, those who will work hard and sacrifice.

Seeing the production schedules, the slogans greeting people day after day, we often said to each other: "It is just like a people at war."

Let me emphasize in closing, lest we be misunderstood, that in pointing up strengths in the Soviet systems attributable to their total commitment to education, we are not extolling the virtues and purposes of the Soviet schools. Their system simply would not fit our way of life.

The American people look to their system of education for infinitely more than the means of political and economic advancement. Our schools must always preserve the intangible values of our free society.

Speaking for ten American educators who have had a unique opportunity to study Soviet schools, let me say that our confidence in the educational system of the United States, as reflected in our better schools, has been strengthened by this experience.

On the other hand, our concern for our weaker and neglected schools has been deepened. We come back convinced that we cannot as a nation afford to disregard the challenge imposed upon us by the Russian race for knowledge.

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By VIRGIL M. BETT

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By JAMES S. SCHINDLER

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The author presents a thoroughgoing analysis of the problems of the valuation of individual assets and equities, the required consents, and the disclosures as of the effective date of the fresh start as well as subsequently. Concepts of valuation are developed which should be useful not only in the restatement in a quasi-reorganization but also in other areas such as merger or other business combination, acquisition of a subsidiary, the break-up of an enterprise into two or more units, and the lump-sum purchase of a group of assets.

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